NEW MEXICO ENVIRONMENT DEPARTMENT
GROUND WATER DISCHARGE PERMIT
MONITORING WELL CONSTRUCTION AND ABANDONMENT GUIDELINES

Purpose: These guidelines identify minimum construction and abandonment details for installation of water table monitoring wells under ground water Discharge Permits issued by the NMED's Ground Water Quality Bureau (GWQB). Proposed locations of monitoring wells required under Discharge Permits and requests to use alternate installation and/or construction methods for water table monitoring wells or other types of monitoring wells (e.g., deep monitoring wells for delineation of vertical extent of contaminants) must be submitted to the GWQB for approval prior to drilling and construction.

General Drilling Specifications:

1. All well drilling activities must be performed by an individual with a current and valid well driller license issued by the State of New Mexico in accordance with 19.27.4 NMAC. Use of drillers with environmental well drilling experience and expertise is highly recommended.
2. Drilling methods that allow for accurate determinations of water table locations must be employed. All drill bits, drill rods, and down-hole tools must be thoroughly cleaned immediately prior to the start of drilling. The bore hole diameter must be drilled a minimum of 4 inches larger than the casing diameter to allow for the emplacement of sand and sealant.
3. After completion, the well should be allowed to stabilize for a minimum of 12 hours before development is initiated.
4. The well must be developed so that formation water flows freely through the screen and is not turbid, and all sediment and drilling disturbances are removed from the well.

Well Specifications (see attached monitoring well schematic):

5. Schedule 40 (or heavier) PVC pipe, stainless steel pipe, carbon steel pipe, or pipe of an alternate appropriate material that has been approved for use by NMED must be used as casing. The casing must have an inside diameter not less than 2 inches. The casing material selected for use must be compatible with the anticipated chemistry of the ground water and appropriate for the contaminants of interest at the facility. The casing material and thickness selected for use must have sufficient collapse strength to withstand the pressure exerted by grouts used as annular seals and thermal properties sufficient to withstand the heat generated by the hydration of cement-based grouts. Casing sections may be joined using welded or threaded joints; the method selected must provide sufficient joint strength for the specific well installation. The casing must extend from the top of the screen to at least one foot above ground surface. The top of the casing must be fitted with a removable cap, and the exposed casing must be protected by a locking steel well shroud. The shroud must be large enough in diameter to allow easy access for removal of the cap. Alternatively, monitoring wells may be completed below grade. In this case, the casing must extend from the top of the screen to 6 to 12 inches below the ground surface; the monitoring wells must be sealed with locking, expandable well plugs; a flush-mount, watertight well vault that is rated to withstand traffic loads must be emplaced around the wellhead; and the cover must be secured with at least one bolt. The vault cover must indicate that the wellhead of a monitoring well is contained within the vault.
6. A 20-foot section (maximum) of continuous-slot, machine slotted, or other manufactured PVC or stainless steel well screen or well screen of an alternate appropriate material that has been approved for use by NMED must be installed across the water table. Screens created by cutting slots into solid casing with saws or other tools must not be used. The screen material selected for use must be compatible with the anticipated chemistry of the ground water and appropriate for the contaminants of interest at the facility. Screen sections may be joined using welded or threaded joints; the method selected must provide sufficient joint strength for the specific well installation and must not introduce constituents that may reasonably be considered contaminants of interest at the facility. A cap must be

attached to the bottom of the well screen; sumps (i.e., casing attached to the bottom of a well screen) should not be installed. The bottom of the screen must be installed no more than 15 feet below the water table; the top of the well screen must be positioned not less than 5 feet above the water table. The well screen slots must be appropriately sized for the formation materials. A slot size of 0.010 inches is generally adequate for most installations.

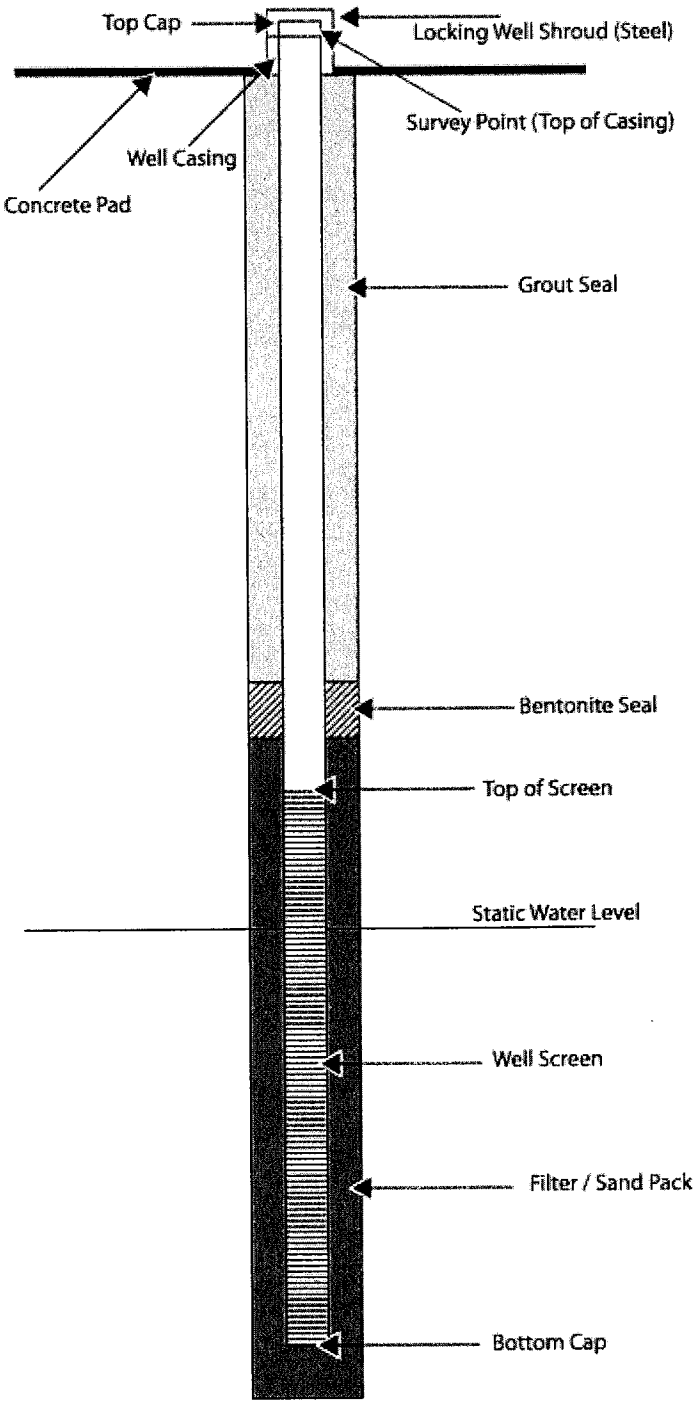
7. Casing and well screen must be centered in the borehole. Placement of centralizers near the top and bottom of the well screen is recommended.
8. A filter pack must be installed around the screen by filling the annular space from 1 foot below the bottom of the screen to 2 feet above the top of the screen with clean silica sand. The filter pack must be properly sized to prevent fine particles in the formation from entering the well; clean medium to coarse silica sand is generally adequate as filter pack material for 0.010-inch slotted well screen. For wells deeper than 30 feet, the sand must be emplaced by a tremmie pipe. The well should be surged or bailed to settle the filter pack and additional sand added, if necessary, before the bentonite seal is emplaced.
9. A bentonite seal must be constructed immediately above the filter pack by emplacing bentonite chips or pellets (3/8-inch in size or smaller) in a manner that prevents bridging of the chips/pellets in the annular space. The bentonite seal must be 3 feet in thickness and hydrated with clean water. Adequate time should be allowed for expansion of the bentonite seal before installation of the annular space seal.
10. The annular space above the bentonite seal must be sealed with a bentonite-cement grout (5 lbs. of powdered bentonite, 94 lbs. of Portland cement, and 6½ to 8½ gallons of clean water), neat cement grout (94 lbs. of Portland cement and 5 to 6 gallons of clean water), or bentonite grout (20 percent solids, created by mixing 50 lbs. of bentonite grout with 24 gallons of clean water). Emplacement of the annular space seal using a tremmie pipe (flow by gravity or pumping through the pipe) is preferred. Annular space seals must extend from the top of the bentonite seal to the ground surface (for wells completed above grade) or to a level 3 to 6 inches below the top of casing (for wells completed below grade).
11. For monitoring wells finished above grade, a concrete pad (2-foot minimum radius, 4-inch minimum thickness) must be poured around the shroud and wellhead. The concrete and surrounding soil must be sloped to direct rainfall and runoff away from the wellhead. The installation of steel posts around the well shroud and wellhead is recommended for monitoring wells finished above grade to protect the wellhead from damage by vehicles or equipment. For monitoring wells finished below grade, a concrete pad (2-foot minimum radius, 4-inch minimum thickness) must be poured around the well vault and wellhead. The concrete and surrounding soil must be sloped to direct rainfall and runoff away from the well vault.

Abandonment:

12. Approval for abandonment of monitoring wells used for ground water monitoring in accordance with Discharge Permit requirements must be obtained from NMED prior to abandonment.
13. Monitoring wells no longer in use must be plugged in a manner to prevent migration of surface runoff or ground water along the length of the well casing. Where possible, this must be accomplished by removing the well casing and pumping bentonite-cement grout, neat cement grout, or bentonite grout (prepared as specified above for annular space seals) from the bottom of the borehole to the ground surface using a tremmie pipe. If the casing cannot be removed, bentonite-cement grout, neat cement grout, or bentonite grout must be emplaced in the well using a tremmie pipe from the bottom of the well to the ground surface.
14. After abandonment, written notification shall be submitted to the NMED with the date and method of abandonment.

Deviation from Guidelines: Requests to construct water table monitoring wells or other types of monitoring wells for ground water monitoring under ground water Discharge Permits in a manner that deviates from the details of these guidelines must be submitted in writing to the GWQB. Each request

must state the rationale for the proposed deviation from these guidelines and provide detailed evidence supporting the request. The GWQB will approve or deny requests to deviate from these guidelines in writing.



NEW MEXICO ENVIRONMENT DEPARTMENT
GROUND WATER POLLUTION PREVENTION SECTION
SYNTHETICALLY LINED LAGOONS - LINER MATERIAL AND SITE PREPARATION GUIDELINES

Purpose: These guidelines represent minimum liner material and site preparation requirements for wastewater treatment, storage and evaporation lagoons. These requirements do not apply to lagoons storing hazardous wastes or high strength waste. The Ground Water Quality Bureau may impose additional requirements (e.g., double-lined lagoons with leak detection) for facilities discharging hazardous or high strength waste to lagoons through the development of specific Discharge Permit conditions for such facilities.

Liner Material Requirements:

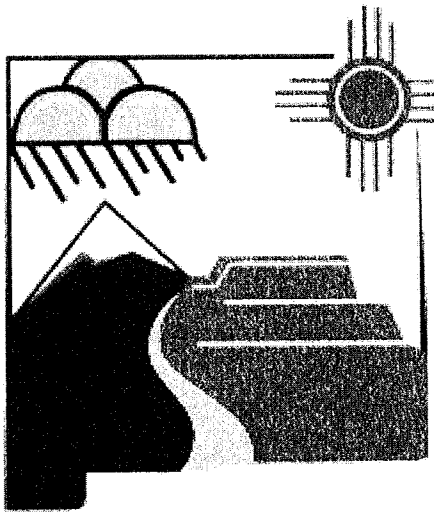
1. The liner shall be chemically compatible with any material that will contact the liner.
2. The liner material shall be resistant to deterioration by sunlight if any portion of the liner will be exposed.
3. Synthetic liner material shall be of sufficient thickness to have adequate tensile strength and tear and puncture resistance. Under no circumstances shall a synthetic liner material less than 40 mils in thickness be accepted. Any liner material shall be certified by a licensed New Mexico professional engineer and approved by the New Mexico Environment Department (NMED) prior to its installation.

Lagoon Design and Site Preparation Requirements:

1. The system shall be certified by a licensed New Mexico professional engineer and approved by NMED prior to installation.
2. Inside slopes shall be a maximum of 3 (horizontal): 1 (vertical), and a minimum of 4 (horizontal); 1 (vertical).
3. Lagoon volume shall be designed to allow for a minimum of 24 inches of freeboard.
4. The liner shall be installed with sufficient liner material to accommodate shrinkage due to temperature changes. Folds in the liner are not acceptable.
5. To a depth of at least six inches below the liner, the sub-grade shall be free of sharp rocks, vegetation and stubble. In addition, liners shall be placed on a sub-grade of sand or fine soil. The surface in contact with the liner shall be smooth to allow for good contact between liner and sub-grade. The surface shall be dry during liner installation.
6. Sub-grade shall be compacted to a minimum of 90% of standard proctor density.
7. The minimum dike width shall be eight feet to allow vehicle traffic for maintenance.
8. The base of the pond shall be as uniform as possible and shall not vary more than three inches from the average finished elevation.
9. Synthetic liners shall be anchored in an anchor trench in the top of the berm. The trench shall be a minimum of 12 inches wide, 12 inches deep and shall be set back at least 24 inches from the inside edge of the berm.
10. If the lagoon is installed over areas of decomposing organic materials or shallow ground water, a liner vent system shall be installed.
11. Any opening in the liner through which a pipe or other fixture protrudes shall be properly sealed. Liner penetrations shall be detailed in the construction plans and record drawings.
12. A synthetic liner shall not be installed in temperatures below freezing.
13. The liner shall be installed or supervised by an individual that has the necessary training and experience as required by the liner manufacturer.
14. All manufacturer's installation and field seaming guidelines shall be followed.
15. All synthetic liner seams shall be field tested by the installer and verification of the adequacy of the seams shall be submitted to NMED along with the record drawings.

16. Concrete slabs installed on top of the synthetic liner for operational purposes shall be completed in accordance with manufacturer and installer recommendations to ensure liner integrity.
17. NMED shall be notified in advance when construction of the lagoon is to begin. NMED shall be notified upon completion of the liner installation and prior to any discharge to the lagoon to allow NMED the opportunity to inspect the liner installation.
18. Record drawings, final specifications and final lagoon capacity calculations shall be submitted to NMED within 30 days of completion of construction. These plans shall be certified by a licensed New Mexico professional engineer.

NMED



New Mexico Environment Department

GROUND WATER QUALITY BUREAU

Guidance for the Development of Ground Water Discharge Permit Engineering Construction Plans and Specifications

Compliance under 20.6.2 NMAC

November 3, 2008

Foreword

The information and procedures outlined in this guidance are intended to clarify and supplement existing requirements. Nothing in this guidance shall affect regulatory requirements. The guidelines and procedures herein are not an adjudication or a regulation. There is no intent on the part of the New Mexico Environment Department, Ground Water Quality Bureau (NMED) to give this document that weight or deference. This document establishes the framework within which NMED will exercise its administrative discretion in implementation of 20.6.2 NMAC, the Water Quality Control Commission Regulations "Regulations" and by extension, the Water Quality Act [Chapter 74, Article 6 NMSA 1978]. NMED reserves the discretion to deviate from this document if circumstances warrant.

The design of wastewater facilities should not be limited by minimum requirements, but must meet the needs of the particular situation. It is not the purpose of this document to set forth data which can be used without due regard for the requirements of the particular project under design. The judgment of the skilled professional engineer is still required to apply these data. NMED will apply more stringent criteria when, in its judgment, their use is justified.

NMED will consider the registered professional engineer whose seal is affixed to facility design documents to be fully responsible for the adequacy of all aspects of the facility design and compliance with state engineering standards and requirements. NMED approval or issuance of a permit does not, in any way, relieve the design engineer of this responsibility.

For further information on this document, please contact:

Charles Thomas, P.E.
Engineer
Ground Water Pollution Prevention Section
Ground Water Quality Bureau
(505) 222-9500
charles.thomas@state.nm.us

Introduction:

The Ground Water Quality Bureau Pollution Prevention Section (GWQB-PPS) has developed this guidance document to clarify the submittal of construction plans and specifications. This document is intended to address two distinct areas, as identified below:

A. To provide clarification on what content is typically required to constitute a complete submittal (20.6.2.1202 NMAC).

B. To provide clarification on the criteria that will be used to evaluate the submittal (20.6.2.3106 NMAC).

The regulatory references cited above are included as Appendix A.

All project submittals should be submitted to the Reviewer assigned to the Discharge Permit. If no Reviewer has been assigned, or if the Reviewer is unknown, then project materials should be submitted to the Santa Fe office of GWQB-PPS at the following address:

George Schuman, Program Manager
Ground Water Quality Bureau
Pollution Prevention Section
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

SECTION ONE: General Project Requirements:

The following information details the minimum project requirements for all construction projects related to a Discharge Permit Application, Discharge Permit Modification, or conditions of a final Discharge Permit. Please note that these requirements address not only design components, but also include submittal of information related to licensure, construction and post-construction activities. NMED reserves the right to require the submission of information in addition to that listed in this guidance or in the event that information submitted is not in accordance with this guidance.

NOTE: Failure to submit information which satisfactorily addresses the items listed in this Section may result in the permit application being denied or additional monitoring, reporting, or recordkeeping requirements.

1. Professional Engineer. The project engineer must be actively licensed to practice engineering in New Mexico. See Section Three for further details.

2. Plans. Plans should show the nature and scope of the work to be performed. For further details, please see "*The Recommended Standards for Wastewater Facilities, New Mexico Environment Department, 2003*", Chapter 20.
3. Specifications. Specifications should include written technical descriptions of materials, equipment, construction systems, standards, and workmanship that will be utilized in the proposed project. For further details, please see Appendix E.
4. Design Analysis Report. The report should contain all the design factors/assumptions and pertinent calculations used in designing/sizing each of the proposed units or components thereof. When a treatment plant is involved, the report should also include information pertaining to expected effluent quality which the designer should be able to support. For further details, please see "*The Recommended Standards for Wastewater Facilities, New Mexico Environment Department, 2003*".
5. Operation During Construction. The submittal should specify, in detail, the procedure for operation during construction specifically with regard to any existing wastewater flows or discharges during construction. Any temporary discharges that are not authorized under an active Discharge Permit will require submission of a Notice of Intent to Discharge (NMAC 20.6.2.1201) unless the discharge is being made into a community sewer or is subject to the Liquid Waste Disposal Regulations.
6. Licensed Contractor. The contractor must be actively licensed in New Mexico and hold the required licensing or certifications necessary for the proposed work. See Section Four for further details.
7. Revisions to Approved Plans. Plans or specifications reflecting any deviations from approved plans or specifications affecting capacity, flow, operation of units, or point of discharge should be submitted well in advance of any construction work that will be affected by such changes to permit sufficient time for review and approval. Structural revisions or other minor changes not affecting capacities, flows, or operation will be permitted during construction without approval by the GWQB-PPS.
8. Manufacturer's Specifications. A copy of all manufacturers' specifications for construction and/or installation of any component related to a sewerage or waste disposal system must be included in the contract documents and/or made available to the contractor prior to commencement of construction.
9. Construction Quality Assurance/Quality Control (QA/QC). Competent and experienced personnel, preferably the design engineer or his representative, should carefully monitor the progress of construction to see that all work conforms to the approved plans and specifications. Reports detailing activities under this item must be submitted to the GWQB-PPS following completion of the project. See Appendix F for further details.
10. Record Drawings (also known as "as-built plans"). The owner must submit record drawings detailing any deviations from the construction plans or specifications to GWQB-PPS following completion of construction activities. Record drawings must be certified by a New Mexico licensed Professional Engineer if a licensed engineer was required as part of the project. See Appendix F for further details.

SECTION TWO: Submittal Evaluation Criteria (20.6.2.3106 NMAC):

A. General Criteria

In reviewing the submittals, the GWQB-PPS has one dominant interest: the protection of the ground water resources of New Mexico against pollution, under the provisions of the law. The plans, specifications, and other supporting materials requested are, therefore, reviewed from the functional point of view to assure the suitability, adequacy, and operating reliability of the contemplated works to contribute to the prevention of ground water pollution as a component of a proposed Discharge Permit.

Matters of structural design, mechanical, electrical and other details are subjects of interest to the GWQB-PPS only to the extent that such items directly affect the functioning of the facilities and are necessary to make the project complete and ready for bidding.

For further clarification, review and approval of a project will be comprised of:

a. Compliance with 20.6.2.3106. (Prevention of contamination of ground water)
b. Compliance with any applicable Discharge Permit requirements.
c. Adherence with applicable GWQB/PPS guidance documents.
d. Adherence with generally accepted engineering design principles.
e. Adherence with all specified elements of construction, installation and commissioning.
f. Evaluation for potential applicability of the Office of the State Engineer Dam Design, Construction and Dam Safety Regulations, 19.25.12 NMAC.

Following is a brief list of materials which will be used to evaluate the submittals. It should be noted that these materials are merely being used to establish a benchmark to provide a uniform and objective means of evaluating the submittal. In cases where listed materials provide conflicting specifications or requirements, in general, the more restrictive specification will supersede.

The lists contained within this Section are in no way to be considered comprehensive or restrictive. The design engineer should rely upon their experience, judgment, and generally accepted engineering practices for the design of wastewater facilities that will meet the requirements of the Water Quality Act, NMSA 1978.

1. The New Mexico Water Quality Control Commission Regulations, 20.6.2 NMAC. The submittal will be evaluated to ensure compliance with all applicable portions of the regulations.
2. The proposed Discharge Permit. The project will be evaluated to ensure compliance with conditions and requirements of the Discharge Permit.
3. The Recommended Standards for Wastewater Facilities, New Mexico Environment Department, 2003. The submitted plans and design information will be evaluated for equivalency with all applicable recommended design standards.
4. The New Mexico Standard Specifications for Public Works Construction, APWA: New Mexico Chapter, 2006. The submitted specifications will be evaluated for equivalency with all applicable construction specifications.

B. On-Site Wastewater Treatment Systems

The following materials are specified as additional review benchmarks for design and construction of on-site wastewater treatment systems.

1. The Liquid Waste Disposal and Treatment Regulations, 20.7.3 NMAC
2. The Uniform Plumbing Code, 14.11.3 NMAC
3. The USDA Soil Survey Manual
4. The EPA Onsite Wastewater Treatment and Disposal Manual, EPA 625/1—80-012

C. Monitoring Wells

The following criteria are specified as additional review benchmarks for design and construction of monitoring wells.

1. MONITORING WELL CONSTRUCTION AND ABANDONMENT GUIDELINES, Ground Water Pollution Prevention Section, New Mexico Environment Department, (most recent version, currently July 2008). http://www.nmenv.state.nm.us/gwb/New_Pages/docs_policy/MonitoringWellGuidelinesFINALJuly2008.pdf
2. Office of the State Engineer, WELL DRILLER LICENSING; CONSTRUCTION, REPAIR AND PLUGGING OF WELLS 19.27.4 NMAC

D. Geosynthetic Membrane Liners

The following criteria are specified as additional review benchmarks for design and construction of geomembrane liners.

1. SYNTHETICALLY LINED LAGOONS - LINER MATERIAL AND SITE PREPARATION GUIDELINES, Ground Water Pollution Prevention Section, New Mexico Environment Department, (most recent version, currently May 2007).

http://www.nmenv.state.nm.us/gwb/New_Pages/docs_policy/Synthetic_Liner_Guidelines_rev00_5-07.pdf.

2. The Energy, Minerals and Natural Resources Department, Oil Conservation Division Pit Regulations, 19.15.17 NMAC.
3. The USDA National Resource Conservation Service (NRCS) National Engineering Handbook, Part 642.
4. The Geosynthetic Institute Specifications. Specifications and documentation can be found at: http://www.geosynthetic-institute.org/

E. Flow Measurement

The following criteria are specified as additional review benchmarks for weirs and flumes used as flow measurement devices.

1. The United States Bureau of Reclamation, Water Measurement Manual, 2001 ed.

F. Climatology

The following criteria are specified as additional review benchmarks for climate data used for precipitation, evaporation, and grading and drainage plans.

1. Western Regional Climate Center; http://www.wrcc.dri.edu/
2. National Oceanic and Atmospheric Administration's National Weather Service; http://www.nws.noaa.gov/
3. USDA Natural Resource Conservation Service (NRCS), Hydraulics and Hydrology; http://www.wcc.nrcs.usda.gov/products/W20/H&H/H&H_home.html
4. City of Albuquerque Development Process Manual; http://www.cabq.gov/planning/dpm/dpm.html

G. Testing and Specification Standards

The following criteria are specified as additional review benchmarks for specifications, test methods, and guides used to provide standardized certification.

1. The American Society for Testing and Materials (ASTM); www.astm.org.
2. The American National Standards Institute (ANSI); www.ansi.org.
3. The National Sanitation Foundation (NSF); www.nsf.org.
4. The American Concrete Institute (ACI); www.concrete.org.

SECTION THREE: Requirement for a Professional Engineer:

The process of performing the work required to complete a set of plans and specifications for many of the required components of a Discharge Permit is recognized as the "practice of

engineering" by the New Mexico State Board of Licensure for Professional Engineers and Surveyors ("NM P.E. Board") through the Engineering and Surveying Practice Act, Sections 61-23-1 through 61-23-32, NMSA 1978. **Please note that neither the GWQB-PPS nor the New Mexico Environment Department has the authority to waive statutory or regulatory requirements administered by other agencies.**

Pursuant to 61-23-3.E.,NMSA 1978 Engineering is defined as,

> "...any creative or engineering work that requires engineering education, training and experience in the application of special knowledge of the mathematical, physical and engineering sciences to such creative work as consultation, investigation, forensic investigation, evaluation, planning and design of engineering works and systems, expert technical testimony, engineering studies and the review of construction for the purpose of assuring substantial compliance with drawings and specifications; any of which embrace such creative work, either public or private, in connection with any utilities, structures, buildings, machines, equipment, processes, work, systems, projects and industrial or consumer products or equipment of a mechanical, electrical, hydraulic, chemical, pneumatic, environmental or thermal nature, insofar as they involve safeguarding life, health or property, and including such other professional services as may be necessary to the planning, progress and completion of any engineering work...."

The GWQB-PPS has been in communication with the NM P.E. Board regarding when a licensed professional engineer would be required to complete the plans and specifications for a Discharge Permit (See Appendix B). Based on communication with the NM P.E. Board, several discrete exceptions are listed below in the next section. **For all design work not explicitly listed in the next section, work associated with any component of a sewerage system will be required to be completed by a professional engineer registered in New Mexico.**

A. Exemptions from the Requirement for a Registered Professional Engineer:

The following are the only exemptions allowed by the GWQB-PPS for the requirement to retain a registered professional engineer to complete plans and specifications.

1. Pursuant to 61-23-22.A NMSA 1978, "A New Mexico licensed architect who has complied with all of the laws of New Mexico relating to the practice of architecture has the right to engage in the incidental practice, as defined by regulation, of activities properly classified as engineering...provided that the architect shall perform only that part of the work for which he is professionally qualified..."

   For compliance with this regulation, the architect shall provide documentation that he is professionally qualified to complete the proposed work.

2. Pursuant to 61-23-22.B NMSA 1978, "An engineer employed by a firm, association or corporation who performs only the engineering services involved in the operation of the employer's business shall be exempt from the provisions of the Engineering and Surveying Practice Act, provided that neither the employee nor the employer offers engineering services to the public."

   For compliance with this regulation, the owner must submit documentation certifying that the engineer is an employee of the business, as defined by the Internal Revenue Service (See Appendix C).

3. Pursuant to 61-23-26.A. NMSA 1978, "…any public work wherein the contemplated expenditure for the complete project does not exceed one hundred thousand dollars…"

   This exemption only applies to "the state or any of its political subdivisions".

4. Construction of a monitoring well.

5. On-going operation and maintenance procedures; activities which are considered to be on-going operation and maintenance procedures include, but are not limited to:

   a. Routine maintenance activities required or recommended by the manufacturer;

   b. leak repair of existing pipeline, lined lagoon, or other facility;

   c. replacement of existing deteriorated pipeline where the new pipeline segment is the same size and alignment as the pipeline to be replaced;

   d. refurbishment or cleaning of a wastewater facility as part a of routine maintenance schedule;

   e. the replacement of chemical feed pumps and associated appurtenances;

   f. the replacement or rehabilitation of filter media;

   g. the replacement of electrical or mechanical equipment in an existing wastewater treatment systems or pipeline appurtenances with the same type, size and rated capacity (including, but not limited to: valves, meters, service laterals, chemical feeders, weirs, grinder pumps, and booster pumps);

6. Any other situation upon written approval by the NM P.E. Board.

SECTION FOUR: Requirement for a Licensed Contractor:

Pursuant to the New Mexico Regulation and Licensing Department, Construction Industries Division, "***Any one engaged in construction-related contracting in New Mexico must be licensed. The activities that are considered to be contracting in New Mexico are defined in the Construction Industries Licensing Act, NMSA 1978, Section 60-13-3.***" As such, all work to be completed as a part of a new discharge plan, discharge plan renewal, or discharge plan modification must be completed by a contractor who is currently licensed in New Mexico and is licensed for the work to be performed. **Please note that neither the GWQB-PPS nor the New**

Mexico Environment Department has the authority to waive statutory or regulatory requirements administered by other agencies.

In addition to licensing through the State of New Mexico, contractors completing work for a Discharge Permit shall be certified for any specialty construction which requires certification by the company providing the product as a condition of receiving a warranty.

APPENDIX A

REGULATORY CITATIONS

20.6.2.1202 FILING OF PLANS AND SPECIFICATIONS--SEWERAGE SYSTEMS:

A. Any person proposing to construct a sewerage system or proposing to modify any sewerage system in a manner that will change substantially the quantity or quality of the discharge from the system shall file plans and specifications of the construction or modification with Ground Water Quality Bureau of the department for discharges that may affect ground water, and/or the Surface Water Quality Bureau of the department for discharges that may affect surface water. Modifications having a minor effect on the character of the discharge from sewerage systems shall be reported as of January 1 and June 30 of each year to the Ground Water Quality Bureau of the department for discharges that may affect ground water, or the Surface Water Quality Bureau of the department for discharges that may affect surface water.

B. Plans, specifications and reports required by this Section, if related to facilities for the production, refinement and pipeline transmission of oil and gas, or products thereof, shall be filed instead with the Oil Conservation Division.

C. Plans and specifications required to be filed under this Section must be filed prior to the commencement of construction.

20.6.2.3106 APPLICATION FOR DISCHARGE PERMITS AND RENEWALS:

A. Any person who, before or on June 18, 1977, is discharging any of the water contaminants listed in Section 20.6.2.3103 NMAC or any toxic pollutant so that they may move directly or indirectly into ground water shall, within 120 days of receipt of written notice from the secretary that a discharge permit is required, or such longer time as the secretary shall for good cause allow, submit a discharge plan to the secretary for approval; such person may discharge without a discharge permit until 240 days after written notification by the secretary that a discharge permit is required or such longer time as the secretary shall for good cause allow.

B. Any person who intends to begin, after June 18, 1977, discharging any of the water contaminants listed in Section 20.6.2.3103 NMAC or any toxic pollutant so that they may move directly or indirectly into ground water shall notify the secretary giving the information enumerated in Subsection B of Section 20.6.2.1201NMAC; the secretary shall, within 60 days, notify such person if a discharge permit is required; upon submission, the secretary shall review the discharge plan pursuant to Sections 20.6.2.3108 and 20.6.2.3109 NMAC. For good cause shown the secretary may allow such person to discharge without a discharge permit for a period not to exceed 120 days.

C. A proposed discharge plan shall set forth in detail the methods or techniques the discharger proposes to use or processes expected to naturally occur which will ensure compliance with this Part. At least the following information shall be included in the plan:

(1) Quantity, quality and flow characteristics of the discharge;

(2) Location of the discharge and of any bodies of water, watercourses and ground water discharge sites within one mile of the outside perimeter of the discharge site, and existing or proposed wells to be used for monitoring;

(3) Depth to and TDS concentration of the ground water most likely to be affected by the discharge;

(4) Flooding potential of the site;

(5) Location and design of site(s) and method(s) to be available for sampling, and for measurement or calculation of flow;

(6) Depth to and lithological description of rock at base of alluvium below the discharge site if such information is available;

(7) Any additional information that may be necessary to demonstrate that the discharge permit will not result in concentrations in excess of the standards of Section 20.6.2.3103 NMAC or the presence of any toxic pollutant at any place of withdrawal of water for present or reasonably foreseeable future use. Detailed information on site geologic and hydrologic conditions may be required for a technical evaluation of the applicant's proposed discharge plan; and

(8) Additional detailed information required for a technical evaluation of underground injection control wells as provided in Sections 20.6.2.5000 through 20.6.2. 5299 NMAC,

D. An applicant for a discharge permit shall pay fees as specified in Section 20.6.2.3114 NMAC.

E. An applicant for a permit to dispose of or use septage or sludge, or within a source category designated by the commission, may be required by the secretary to file a disclosure statement as specified in 74-6-5.1 of the Water Quality Act.

F. If the holder of a discharge permit submits an application for discharge permit renewal at least 120 days before the discharge permit expires, and the discharger is not in violation of the discharge permit on the date of its expiration, then the existing discharge permit for the same activity shall not expire until the application for renewal has been approved or disapproved. A discharge permit continued under this provision remains fully effective and enforceable. An application for discharge permit renewal must include and adequately address all of the information necessary for evaluation of a new discharge permit. Previously submitted materials may be included by reference provided they are current, readily available to the secretary and sufficiently identified to be retrieved.

[2-18-77, 6-26-80, 7-2-81, 9-20-82, 8-17-91, 12-1-95; 20.6.2.3106 NMAC - Rn, 20 NMAC 6.2.III.3106, 1-15-01; A, 12-1-01; A, 9-15-02]

APPENDIX B

CORRESPONDENCE WITH THE NM BOARD OF LICENSURE FOR PROFESSIONAL ENGINEERS AND SURVEYORS

State of New Mexico
ENVIRONMENT DEPARTMENT
Ground Water Quality Bureau
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502-6110
Telephone (505) 827-2918
Fax (505) 827-2965

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

DERRITH WATCHMAN-MOOR
DEPUTY SECRETARY

October 30, 2003

Elena Garcia
Executive Director
New Mexico Board of Licensure for
Professional Engineering and Surveyors
1010 Marquez Place
Santa Fe, NM 87505

Dear Ms. Garcia:

The New Mexico Environment Department (NMED), Ground Water Quality Bureau (GWQB) has the responsibility for administration of the Water Quality Control Commission (WQCC) Regulations as they apply to domestic, industrial, mining and agricultural discharges that have the potential to impact ground water quality. Under the WQCC regulations these facilities are required to have a Ground Water Discharge Permit which demonstrates that operations at the facility will not cause ground water standards to be exceeded.

As part of the permitting process the GWQB requires submittal of plans and specifications and supporting calculations for wastewater systems, however, the WQCC Regulations do not specify that submittals be certified by a professional engineer. Historically, the "plans and specifications" received by the GWQB vary greatly – from conceptual sketches to professional submittals from engineering consulting firms.

The GWQB is seeking clarification from the New Mexico Board of Licensure for Professional Engineering and Surveyors (Board) on the types of designs and components of wastewater treatment and disposal systems that the Board believes to fall within the practice of engineering and therefore require certification by a New Mexico Professional Engineer. The GWQB recognizes that the determination of what falls within the "practice of engineering" is within the jurisdiction of the Board. The GWQB believes that clarification from the Board will greatly improve the quality of submittals received by the Bureau and significantly improve the protection of the public health and the environment.

The attached Exhibits 1 – 6 are examples of "plans and specifications" for designs and as-built documentation for a few of the wastewater treatment and disposal systems received by the GWQB. The GWQB respectfully requests an opinion on the following questions:

1. Are designs and supporting calculations (e.g. sizing, slopes) for wastewater storage, treatment and disposal systems considered to be under the jurisdiction of the NM Engineering and Surveying Practice Act (Act) and therefore require certification of a professional engineer?

Typical wastewater system operational plan submittals include:

- Impoundments such as treatment, evaporative, storage and storm-water
- Synthetic and clay lagoon liners and leak detection systems
- Wastewater Treatment Plants (pre-manufactured, constructed on-site)
- Pump stations and lift stations for conveyance of wastewater
- Conveyance systems
- Irrigation systems (center pivot, side roll, flood)
- Pressure dosed leachfields
- Large capacity septic tank leachfield systems (> 2,000 gpd)
- Effluent disinfection units

2. Does the Act cover construction oversight and as-built documentation?

3. In the event that a pre-manufactured "package treatment plant" or other prepackaged treatment process (disinfection unit) is located on a lot or integrated into a larger wastewater treatment and disposal system would a certification by a professional engineer be required?

4. Do federal agencies have any special privileges or exemptions under the Act?

Thank you for taking this matter to the Board for their consideration and opinion. Should you need additional information or have any questions, please contact me at (505) 827-2945, Dale Doremus at (505) 476-3648 or Fred Kalish at (505) 827-2713.

Sincerely,

Maura Hanley for J. Schoeppner

Jerry Schoeppner, Chief
Ground Water Quality Bureau

STATE OF NEW MEXICO
BOARD OF LICENSURE FOR PROFESSIONAL ENGINEERS
AND SURVEYORS

1010 Marquez Place, Santa Fe, NM 87505
(505) 827-7561
www.state.nm.us/pepsboard

BILL RICHARDSON
GOVERNOR

DEC 2 4 2003

December 15, 2003

Mr. Jerry Schoeppner, Chief
Ground Water Quality Bureau
Environment Department
Harold Runnels Building
P.O. Box 26110
Santa Fe, NM 87502-6110

Dear Mr. Schoeppner:

This is in response to your letter of October 30, 2003. The Professional Engineering Committee of the Board reviewed your letter and its Exhibits 1-6 during the Committee's meeting of November 6, 2003.

It is our understanding that the Ground Water Quality Bureau is responsible for issuing discharge permits and enforcing regulations on domestic, industrial, mining and agricultural discharges that have the potential to impact the quality of the State's ground water resources. You indicated in your letter that the Department's regulations do not specify whether or not plans, specifications and supporting calculations for wastewater systems be certified by a New Mexico professional engineer. Perhaps this is one reason why the wide spectrum of quality and contents that the submittals received by your Bureau seem to have. We will be happy to comply with your request regarding the correlation between the Board's understanding of what constitutes engineering work, which according to the statutes requires the intervention of a registered engineer.

I summarize below our response to your various items regarding domestic, industrial, mining and agricultural discharges, as well as those related to large capacity (flows>2,000 gpd) septic tank and infiltration systems.

1. Design and supporting calculations (e.g. sizing, slopes) for wastewater storage, treatment and disposal systems are considered to be under the jurisdiction of the NM Engineering and Surveying Practice Act (Act) and do require to be certified as performed by or under the direct supervision of a New Mexico licensed professional engineer.

2. Although the New Mexico Engineering and Surveying Practice Act under Section 61-23-3 E states *"....The 'practice of engineering' does not include responsibility for the supervision of construction, site conditions, operations, equipment, personnel or the maintenance of safety in the work place;..."* professional engineers may provide these services as required by contractual obligations. Construction oversight may be completed by trained inspectors. The certification of as-built drawings implies the modification of engineering drawings, and should be considered engineering work. For the protection and safety of the public, it seems to me and my fellow members that the Department should ensure that all wastewater treatment systems are designed by professional engineers and constructed in accordance to the approved engineering plans. This can be accomplished by requiring submission of as-built drawings certified by a New Mexico licensed PE.
3. Pre-manufactured "package treatment plants" to be installed on a lot or integrated into a larger wastewater treatment and disposal system, should be certified by a PE. Obviously all off the shelf treatment systems have been pre-engineered prior to being marketed, and therefore, certified by a licensed PE -though not necessarily a New Mexico PE- at some point or another. However, putting together a number of pre-engineered parts into the design of a new treatment facility should be performed by a NM PE, so that the site-specific applicability of all systems is taken into account.
4. Federal agencies do not have any special privileges or exemptions under the Act. As you may know, the federal exemption was removed out of the New Mexico Engineering and Surveying Practice Act during the 2nd Session of the 43rd Legislature, Laws of 1998. While there may be federal law which exempts "employees" of the federal government, the board is of the opinion that contractors and sub-contractors to the federal government must be New Mexico licensed professional engineers in order to provide services to the federal government on, or off, federal premises. Federal employees also may not provide engineering services outside their federal employment if they are not licensed PEs in New Mexico.

I hope our response addresses all of your concerns on this matter. If we may be of further assistance, do not hesitate to contact our executive director, Elena Garcia at 827-7546.

Sincerely,

Subhas Shah, PE
Chairman, Professional Engineering Committee

APPENDIX C

INTERNAL REVENUE SERVICE DEFINITON OF EMPLOYEE

The following definition of Employee was taken from the website of the Internal Revenue Service, at: http://www.irs.gov/govt/fslg/article/0,,id=110344,00.html

Employee or Independent Contractor?

Whether someone who works for you is an employee or an independent contractor is an important question. The answer determines your liability to pay and withhold Federal income tax, social security and Medicare taxes, and Federal unemployment tax.

In general, someone who performs services for you is your employee if you can control what will be done and how it will be done. The courts have considered many facts in deciding whether a worker is an independent contractor or an employee. These facts fall into three main categories:

- **Behavioral Control –** Facts that show whether the business has a right to direct and control. These include:
    - Instructions - an employee is generally told:
        1. when, where, and how to work
        2. what tools or equipment to use
        3. what workers to hire or to assist with the work
        4. where to purchase supplies and services
        5. what work must be performed by a specified individual
        6. what order or sequence to follow
    - Training – an employee may be trained to perform services in a particular manner.
- **Financial Control –** Facts that show whether the business has a right to control the business aspects of the worker's job include:
    - The extent to which the worker has unreimbursed expenses
    - The extent of the worker's investment
    - The extent to which the worker makes services available to the relevant market
    - How the business pays the worker
    - The extent to which the worker can realize a profit or loss
- **Type of Relationship –** Facts that show the type of relationship include:
    - Written contracts describing the relationship the parties intended to create
    - Whether the worker is provided with employee-type benefits
    - The permanency of the relationship
    - How integral the services are to the principal activity

For a worker who is considered your employee, you are responsible for:

- Withholding Federal income tax,
- Withholding and paying the employer social security and Medicare tax,
- Paying Federal unemployment tax (FUTA)
- Issuing Form W-2, Wage and Tax Statement, annually,
- Reporting wages on Form 941, Employer's Quarterly Federal Tax Return.

For a worker who is considered an independent contractor, you may be responsible for issuing Form 1099-MISC, *Miscellaneous Income*, to report compensation paid.

The status of certain workers is specifically determined by law; these workers are known as **statutory employees** and **statutory non-employees.** See Publication 15-A, *Employer's Supplemental Tax Guide*, for more information.

If you would like for the IRS to determine whether or not a worker is considered an employee, please submit Form SS-8, *Determination of Worker Status for Purposes of Federal Employment Taxes and Income Tax Withholding.*

APPENDIX D

SPECIFICATION MINIMUM REQUIREMENTS

Specifications

GENERAL

According to the American Institute of Architects (AIA), AIA document A201-1997, "The specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards, and workmanship for the Work, and performance of related services."

In general terms, the plans are a graphical depiction of the work, and the specifications are written descriptions of the end result of the work to be performed. As such, the specifications must include greater detail than that which can often be placed on the plan sheets. The specifications should generally describe the following:

1. The type and quality of every product in the project.
2. The quality of the workmanship, including the quality during manufacture, fabrication, application, installation, finishing and adjusting.
3. Requirements for fabrication, storage, erection, application, installation, and finishing.
4. Applicable regulatory requirements, including codes and standards applicable to performance of work as part of the project.
5. Instructions for testing materials and equipment as necessary to meet design standards.
6. Performance tests for the completed facilities and component units.
7. Specification and procedures for operation during construction.

For the purposes of this document, the review and approval of specifications is limited to evaluating applicable specifications to determine of the work associated within each specification is protective of groundwater quality.

NM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

Many project documents often reference the New Mexico Standard Specifications for Public Works Construction (NMSSPWC) in lieu of providing actual written technical specifications. This practice is acceptable to NMED-GWQB if completed correctly.

- The technical specifications must address key administrative project specifications, such as the sequence of work and the project record documents. The NMSSPWC does not comprehensively address the general administrative project requirements for construction, such as summary of the project, sequence of work, temporary facilities or utilities, project record documents, etc.
- All relevant product specifications should be included in the project document. Several key specifications for waste disposal are not included in the NMSSPWC and will need to be included separately, such as flexible membrane liners and on-site waste disposal systems.
- The specifications should be complete and specific to each project. In the preface of the NMSSPWC, it states, "It is the responsibility of the user to amend these standard specifications to make them specifically applicable for their project." Please ensure that

relevant specifications have been reviewed and/or amended to match the specific project requirements.

CONTENT

Specifically with regard to a construction project related to a Discharge Permit, the following items should be included in the specifications, as appropriate:

For ALL Projects, general project specifications should be included which describe:

1. Summary of Work. This section should include:
    a. A project description;
    b. A summary of work under this contract; and
    c. A construction sequence and schedule.
2. Regulatory Requirements. This section should identify:
    a. All applicable Codes, laws, ordinances, and regulations.
3. Quality Control. This section should identify:
    a. Regulatory requirements for testing;
    b. The Contractor's responsibilities for quality control; and
    c. A summary of required inspections and tests.
4. Product Requirements. This section should identify:
    a. The general requirements for delivery, storage, and handling;
    b. Requirements for product substitution; and
    c. The general requirements for performance, quality, completeness, and integration of products into the project.
5. Execution Requirements. This section should identify:
    a. The requirements for application, erection and installation of the products, including preparation, cleaning, adjusting and protection of completed work;
    b. Contract close out procedures;
    c. Operation and maintenance data;
    d. Product warranties and guaranties; and
    e. Project record documents.

With respect to individual projects there are also individual specifications which either contain components required as part of a Discharge Permit submittal or are seen as the most likely to result in impact to groundwater if incorrect or inadequate. These individual specifications are listed below, categorized by project type. This list should in no way be considered comprehensive or limiting as the range of projects, and thereby individual specifications, is too broad to cover completely in this document.

The content of each specification should generally follow the outline for general specifications listed above. For any specific requirements, please refer to the benchmark reference sources listed in Section Two of this document.

1. Flexible Liner Projects:
    a. Subgrade Preparation.
    b. Anchor Trenching
    c. Flexible Liner Materials & Installation
2. Concrete Installation
    a. Subgrade Preparation
    b. Concrete Materials and Methods
    c. Cast-In-Place or Precast Concrete Products & Installation
    d. Grout, Adhesives, Joint Sealants
3. Pipelines
    a. Trenching, Backfilling & Compacting
    b. Pipe Materials & Installation
    c. Valves
4. Pumps
    a. Pump Products & Installation
5. Waste Treatment Facilities
    a. Treatment Facility Products & Installation
6. On-Site Waste Disposal
    a. Subgrade Preparation
    b. Pipelines (See Above)
    c. Disposal Field Installation

APPENDIX E

GRADING AND DRAINAGE PLANS

Grading and Drainage Plans

GENERAL

A Grading and Drainage Plan will be required to be submitted as part of any Discharge Permit where, due to the expected or proposed site conditions, the quality of the precipitation or storm water runoff from the site will or has become impacted and no longer qualifies for an exemption pursuant to 20.6.2.3105 NMAC.

CONTENT

The Grading and Drainage Report must encompass the following items:

1. General project location – A map from 7.5 minute quad map showing drainage basin influencing flows onto site from off site, or equivalent.
2. Drainage concept for site. (Narrative – Cover Letter)
    a. How offsite flows entering the site will be handled.
    b. How onsite flows will be handled.
3. Existing Conditions
    a. Existing onsite drainage flow patterns
    b. Offsite drainage patterns entering the site
    c. Offsite drainage facilities – (e.g. municipal storm sewers)
    d. Drainage basin boundaries - the area of the basin that has a direct impact on the on-site hydrology.
    e. Proximity to designated FEMA flood hazard zones
    f. Presence of any other relevant features (e.g. roadways, structures, etc.)
4. Developed Conditions
    a. Proposed development and/or construction
    b. Point(s) of discharge
    c. Proposed drainage flow pattern changes, both on-site and offsite
    d. Impacts on quantities of flows generated on site and discharged off site due to increased impermeable surfaces.
    e. Impacts to any onsite facilities
    f. Impacts to any FEMA flood hazard zones
    g. Changes to any drainage basin boundaries due to development
    h. Capacity and freeboard of existing onsite facilities
    i. Capacity and freeboard of proposed onsite facilities
    j. Specifications for the proposed grading and/or soil compaction

CALCULATIONS

As a supplement, provide a narrative description of the calculations performed to support the proposed drainage plan. Include calculations for both existing and developed conditions relevant to the discharge permit. Discuss and reference hydraulic calculations demonstrating capacity and/or adequacy of existing and proposed facilities. Please also reference computer software, documents, circulars, manuals, etc. used to develop the drainage calculations.

1. The design criteria for the grading and drainage plan is a 25 year, 24 hour storm event.

FORMAT

The Grading and Drainage Plan must adhere to or contain the following format elements:

1. North Arrow.
2. Scale – must allow all necessary information to be plainly shown. Maximum Scale is recommended to be 1"= 60' for on-site grading
3. Notes defining property line, ponding areas, project limits, and all other areas whose definition would increase clarity.
4. Vicinity Map
5. Contributing Area – delineation of off-site contributing watersheds. Watershed and Basin designations shall match those used in the hydrology calculations.
6. Benchmark – location, description and elevation.
7. Existing and Proposed Contours - Vertical intervals for contour maps shall not exceed
   a. One foot intervals for slopes under 1%
   b. Two foot intervals for slopes between 1% and 5%
   c. Five foot intervals for slopes in excess of 5%
8. Spot elevations – supply spot elevations at the following:
   a. Key points and grade breaks
   b. Critical locations
   c. Floor and/or Pad elevations for existing and/or proposed structures.
   d. Inverts of piping associated with system
9. Identification of all existing and proposed structures located on-site.
10. Identification of all existing and proposed drainage facilities located on site.
11. Pertinent elevations of structures and facilities.
12. Internal contributory drainage areas, including roof areas, parking lots, and other disturbed areas (e.g. feed lots), outlined on plan.
13. Flows (CFS) and flow lines defined by arrows and spot elevations, as appropriate for clarity.
14. Details of ponds (and identification as a retention or detention pond), inlets, rundowns, emergency spillways, pond outlets (retention ponds), slopes, and all other significant drainage structures with contours, cross-sections and spot elevations. All cross-sections must be drawn to a standard engineering scale and adequately dimensioned.
15. Plans must be sealed by an Engineer licensed in the State of New Mexico

REFERENCES

1. Western Regional Climate Center; http://www.wrcc.dri.edu/
2. National Oceanic and Atmospheric Administration's National Weather Service; http://www.nws.noaa.gov/
3. USDA Natural Resource Conservation Service (NRCS), Hydraulics and Hydrology; http://www.wsi.nrcs.usda.gov/products/W2Q/H&H/H&H_home.html
4. City of Albuquerque Development Process Manual; http://www.cabq.gov/planning/dpm/dpm.html

APPENDIX F

CONSTRUCTION QUALITY CONTROL & QUALITY ASSURANCE

Construction Quality Control and Quality Assurance

GENERAL

As stated in the Water Quality Control Commission Regulations (20.6.2 NMAC), the purpose of the GWQB-PPS is "*to protect all ground water of the state of New Mexico...for present and potential future use as domestic and agricultural water supply...*". The purpose of a discharge permit is to authorize the controlled discharge of effluent onto or below the surface of the ground, with the intent being that the manner of the approved discharge will satisfy the purpose, as stated previously. The prevention of groundwater contamination becomes an even more critical factor when the ability to remediate contaminated soil or groundwater is considered. Many of the remediation technologies, such as pump and treat, are only marginally effective and the cost can be prohibitive. What this translates to is the concept that in most cases, contamination of the groundwater should be considered at least partially "irreversible".

As related to 20.6.2.1202 – "Filing of Plans and Specifications – Sewerage Systems", one of the barriers to groundwater contamination is to ensure that all pertinent facilities are constructed as designed, to avoid such issues as premature failure, leakage, overloading, etc., which may result in groundwater contamination. To establish this, Section Two of this document lists the following as submittals:

- Construction Quality Assurance/Quality Control (QA/QC) Documentation
- Record Drawings

Although the primary use of this documentation is to verify the scope and quality of construction for the purposes of contractual obligation, warranty and liability, this documentation also establishes the additional goal of identifying whether or not the construction itself is a successful barrier to groundwater contamination. The following subsections identify more detailed requirements of the format and content of the submittals.

CONSTRUCTION QA/QC DOCUMENTATION

1. The owner or his representative shall maintain records of installation, sampling, testing, installation verification, and other preparatory or start up activities required as part of the project documentation for any component related to a sewerage or waste disposal system.

2. Submittals should contain the actual results of any sampling or testing and copies of any reports or documentation required for warranty certification.

3. A summary of the sampling and testing certified by the responsible engineer may be submitted in lieu of the actual results. The report must contain a summary of all actual results and must be stamped and sealed by the responsible Professional Engineer.

4. Submittal information may include, but is not limited to:

    a. Soil profiles;

b. Soil testing (Atterberg Limits, Sieve Analysis, Moisture, Density, Consolidation/Collapse));
c. Field density tests;
d. Concrete strength tests;
e. Leakage tests;
f. Mandrel tests;
g. Pressure tests, and
h. Flexible Liner destructive and non-destructive testing.

RECORD DRAWINGS

1. Record drawings shall be prepared and certified by a Professional Engineer and/or Professional Land Surveyor currently licensed in the State of New Mexico.
2. Each sheet shall be sealed and be clearly marked "Record Drawings" with the date.
3. Record drawings shall include all changes in the plans, including those issued as change orders, plan clarifications, addenda, notices to bidders, responses to requests for information, jobsite memos, and any additional details needed for the construction of the project but not shown on the "as-bid" plans.
4. Record drawings must show the horizontal location of all changes denoting the actual location to the nearest 1.0 ft. where applicable. An enlarged detail must be included when multiple items are installed as a unit or when clarity of the location of the changes cannot be obtained on standard plan and profile views.
5. Record drawings must show the vertical elevation of all changes denoting the actual elevation to the nearest 0.1 ft. where applicable. An enlarged detail must be included when multiple items are installed as a unit or when clarity of the location of the changes cannot be obtained on standard plan and profile views.
6. All changes should be legible, clearly identified, and easily distinguishable from the "as-bid" plans.

APPENDIX G

PLAN AND SPECIFICATION REVIEW CHECKLIST

New Mexico Environment Department
Ground Water Quality Bureau
Construction Review Checklist

August 22, 2008

General Submittal Components:

- ☐ Does the submittal contain a Discharge Permit Application?
  - o Topography
  - o Flood potential
  - o Soils Report
  - o GW Hydrology Report
  - o Geology Report
- ☐ Does the submittal contain a Facility Site Plan?
- ☐ Does the submittal contain a Grading & Drainage Plan (NPDES Permit)?
- ☐ Does the submittal address backflow protection?
- ☐ Does the site plan contain a scale & north arrow?
- ☐ Do the plans contain topography and elevations?
- ☐ Do the plans show relevant existing facilities?
- ☐ Do the plans contain profile views, with invert and surface elevations, as needed?
- ☐ Do the plans contain a schematic layout or process flow diagram?
- ☐ Do the specifications address the project components?
- ☐ Do the specifications contain appropriate manufacturer's specs, or a reference to them?
- ☐ Do the specifications contain a section for handling existing waste streams, if any, during construction?
- ☐ Do the specifications contain details for QA/QC? Must include measures for success.
- ☐ Do the specifications contain a section for as-builts or record drawings?
- ☐ Are the design parameters or the basis of design included?
- ☐ Does the submittal identify the contaminants of concern?

Flow Measurement Review:

- ☐ Does the project have suitable flow measurement identified?

- ☐ Can the flow meter can be field calibrated (generally requires primary measuring device or volumetric measurement comparison capability)?
- ☐ For flumes, does the flow measurement device have the proper inflow and outflow hydraulics?

Design – Treatment & Capacity Review:

- ☐ Does the design incorporate wet weather flows (Inflow/Infiltration)?
- ☐ Do the design flow calculations include the average, maximum, and peak hourly flows?
- ☐ Do the BOD, Nitrogen, etc. loading calculations include the average, maximum, and peak hourly flows?
- ☐ Is there sampling data of existing waste flow streams, if applicable?
- ☐ Does the design account for varying operating conditions, i.e. temperature, altitude, seasonality?
- ☐ Are parallel treatment trains provided?
- ☐ Is septage or other special wastes included?
- ☐ Does the proposal address any pre-treatment requirements for treatment or pumping components?

Waste Containment Review:

- ☐ Does the pond design account for evaporation and precipitation?
- ☐ Is the pond protected from stormwater runoff and flooding?
- ☐ Is there a specification for subgrade preparation?
- ☐ Does the specification for subgrade preparation include density testing, locations, and quantity of tests to be taken?
- ☐ Will construction of the subgrade require fill material? If so, is this addressed within the specifications?
- ☐ For total evaporative ponds, is the retention volume sufficient for longterm operation? If runoff will be incorporated, verify retention of storm water flows into design.
- ☐ Does the pond provide 2 feet of freeboard at a minimum?
- ☐ Does the pond contain an overflow?
- ☐ Is the dike width sufficient (8' or greater)?
- ☐ Does the pond contain side markings or other means of measurement to determine depth of wastewater contained?

- ☐ Is the side slope grade acceptable? (3:1 maximum for flexible membrane or clay liners).
- ☐ Are inlet/outlet aprons or other protection provided for liner protection? This is particularly critical for Compacted Clay Liners(CCL) and Geosynthetic Clay Liners (GCL).
- ☐ Are the pond lining material properties compatible with proposed installation (i.e, strength, UV resistance, etc.)?
- ☐ Is the depth to ground water & the depth to bedrock sufficient (four feet and ten feet minimum respectively)?

Concrete Construction Review:

- ☐ Is the concrete formulation compatible with sewage characteristics?
- ☐ Does the construction of holding tanks or other facilities that will be submerged include a water stop or other joint sealant?
- ☐ Does the submittal include subgrade preparation?
- ☐ Is the proposed concrete strength sufficient?

Sewers/Collection Lines Review:

- ☐ Is the gravity sewer line proposed meet minimum diameter requirements?
- ☐ Is the depth of cover sufficient for any expected surface loading (i.e. roadways, structures, etc.)
- ☐ Is the proposed piping material compatible with the expected sewage characteristics?
- ☐ Do the specifications include a section for trenching and backfill?
- ☐ Does the specification for trenching and backfill include density testing, locations, and quantity of tests to be taken?
- ☐ Is the hydraulic grade sufficient?
- ☐ Are manholes included at the proper spacing and alignment?
- ☐ Are there any bends, tees, or intersections in the gravity flow pipelines?
- ☐ Have installation procedures been provided?
- ☐ Do the specifications include leakage testing?
- ☐ Do the specifications include mandrel testing for flexible pipe materials?
- ☐ Is the correct pressure class pipe specified for pressurized flows?

Geomembrane Liners Review:

- ☐ Does the specification for subgrade preparation include ensuring a smooth, rock and vegetation free surface for the liner?
- ☐ Does the liner specification address material inspection, storage, and handling?
- ☐ Does the liner specification address the installation procedures?
- ☐ Does the design contain an anchor trench?
- ☐ Are penetrations/attachments to concrete, etc water tight?
- ☐ Does the liner material require cover material (UV protection)?
- ☐ Are the soils beneath the liner suitable (No Class V without venting)?
- ☐ Do the liner specifications include leakage testing (membranes & seams, to include both destructive and non-destructive testing)?
- ☐ Is the liner material compatible with expected wastewater characteristics (concentration, acidity, corrosivity, etc.)?
- ☐ Is the operating depth of the pond sufficient to prevent wind action affecting the liner?
- ☐ For shallow lagoons or lagoons that will be mostly empty, is ballasting or other anchoring provided?

Onsite Disposal Review:

- ☐ Check the site location – Is the disposal site located near wells or other restrictive elements?
- ☐ Check the site location – Is the disposal site located within a floodplain?
- ☐ Does the application contain an alternate disposal field location of sufficient size?
- ☐ Is the depth to ground water sufficient, including seasonal fluctuation (twenty feet minimum)?
- ☐ Does the submittal contain sufficient numbers of soil profiles or percolation tests (minimum of two) or other information for determination of hydraulic leaching characteristics?
- ☐ Is the disposal field sized correctly?
- ☐ Is the distribution network designed for even distribution of effluent?
- ☐ Could the disposal site be impacted by stormwater runoff and flooding?
- ☐ Are there any structures, drive paths, or plants placed over the disposal field?
- ☐ For ET beds, does the design incorporate both evaporation & precipitation correctly?
- ☐ Are there grease traps or interceptors for kitchen facilities?

Emergency Operation Review:

- ☐ Does the design contain standby power or sufficient storage?
- ☐ Does the design contain alarms or other means of failure notification?
- ☐ Does the design provide for bypass or overflow?
- ☐ Does the design incorporate parallel treatment/pumping units?
- ☐ Does the design incorporate low and high level water alarms, as necessary for operation?
- ☐ Are alarms and operation equipment (pumps, etc.) on independent circuit breakers?